CLAIMS

1. The method of treating the surface of a roadway by depositing snow/ice treatment liquid onto the surface of the roadway as a liquid quantity per unit of roadway length from a vehicle moving at a given forward velocity and direction having leftward and rightward pavement engaging wheels generally exhibiting wheel tracks spaced apart along a vehicle width and a support portion; comprising the steps of:

(a) supporting a tank contained source of said liquid at said vehicle support portion;

(b) providing at least one streamer nozzle having an input, a nozzle axis and an output with a nozzle effective diameter;

(c) mounting said streamer nozzle generally about the region established by said vehicle width in an orientation wherein said nozzle output is rearwardly directed said nozzle axis extends substantially parallel with said roadway surface and vehicle forward direction and is located in spaced adjacency with said pavement surface;

(d) providing a fluid transfer assembly including a drivable pump assembly and extending in fluid transfer communication between said tank contained source of said liquid and said streamer nozzle input;

(e) monitoring the forward velocity of said vehicle; and

(f) driving said pump assembly in correspondence with said monitored forward velocity and said nozzle effective diameter at a pump speed effective to express said liquid from said nozzle with a fluid flow velocity vector substantially parallel with said surface and corresponding with said vehicle forward velocity.

2. The method of claim 1 in which:

said step (f) drives said pump assembly at a rate expressing from said streamer nozzle a volume of said liquid corresponding with said quantity of liquid per unit of roadway length.

3. The method of claim 2 in which:

said step (b) provides said streamer nozzle as having a nozzle effective diameter corresponding with said pump assembly rate of expressing a volume of said liquid.

4. The method of claim 2 in which:

said step (d) provides said fluid transfer assembly pump assembly as having at least one fixed displacement pump.

5. The method of claim 1 in which:

said step (c) mounts a said streamer nozzle spaced leftwardly outwardly from the wheel track of a said leftward wheel.

6. The method of claim 5 in which:

said step (c) mounts a said streamer nozzle generally between the wheel tracks of said leftward and rightward wheels.

7. The method of claim 5 in which:

said step (d) provides said fluid transfer assembly as having a discrete said pump coupled in fluid transfer relationship with the streamer nozzle input of said streamer nozzle spaced leftwardly outwardly from the wheel track of said leftward wheel.

8. The method of claim 6 in which:

said step (d) provides said fluid transfer assembly as having a discrete pump coupled in fluid transfer relationship with the streamer nozzle input of said streamer nozzle located between the wheel tracks of said leftward and rightward wheels.

9. The method of claim 1 in which:

said step (c) mounts a said streamer nozzle spaced rightwardly outwardly from the wheel track of said rightward wheel.

10. The method of claim 9 in which:

said step (d) provides said fluid transfer assembly as having a discrete said pump coupled in fluid transfer relationship with the streamer nozzle input of said streamer nozzle spaced rightwardly outwardly from the wheel track of said rightward wheel.

11. The method of claim 9 in which:

said step (c) mounts a said streamer nozzle generally between the wheel tracks of said leftward and rightward wheels.

12. The method of claim 11 in which:

said step (d) provides said fluid transfer assembly as having a discrete pump coupled in fluid transfer relationship with the streamer nozzle input of said streamer nozzle located between the wheel tracks of said leftward and rightward wheels.

13. The method of claim 1 in which:

said step (c) mounts said streamer nozzle to be located in spaced adjacency with said pavement surface to generally encounter a surface effect avoiding vehicle induced air turbulence.

14. The method of claim 1 in which:

said step (c) mounts said streamer nozzle to be located from about two inches to about six inches from said pavement surface.

15. The method of claim 1 in which:

said step (c) mounts said streamer nozzle forwardly of said leftward and rightward pavement engaging wheels.

16. The method of claim 1 in which:

said step (c) mounts said streamer nozzle in an orientation wherein said nozzle axis is canted downwardly from a plane parallel with said pavement surface an angle from 0° to about 5°.

17. The method of claim 1 in which:

said vehicle is a trailer; and

said step (a) supports said tank contained source of said liquid at a support portion of said trailer.

18. Snow/ice control apparatus for treating the surface of a roadway by depositing snow/ice treatment liquid thereon from a vehicle moving at a given forward velocity and direction, having leftward and rightward pavement engaging wheels generally exhibiting respective left and right wheel tracks spaced apart along a vehicle track width and having a support portion, comprising:

a tank assembly mountable upon said vehicle support portion and configured to retain a quantity of said snow/ice treatment liquid;

a nozzle assembly mountable upon said vehicle including a nozzle support extending in spaced adjacency with said roadway surface and one or more streamer nozzles, including a left streamer nozzle, each having an input, a nozzle axis and a nozzle effective diameter, said left streamer nozzle being supported by said nozzle support laterally from said left wheel track in spaced adjacency with said pavement surface in a rearwardly directed orientation wherein the nozzle axis thereof extends substantially parallel with said roadway surface and vehicle forward direction;

a motor assembly supportable upon said vehicle and controllable when activated to provide one or more drive outputs;

a first pump supportable upon said vehicle, coupled in driven relationship with a said drive output, having a first pump input coupled in fluid flow transfer relationship with said tank assembly and a first pump output coupled in fluid flow transfer relationship with the input of said left streamer nozzle; and

a control assembly responsive to said vehicle velocity to control said motor assembly, when activated, in correspondence with a target volume of said liquid per unit length of pavement, the output of said first pump and the effective diameter of said left streamer nozzle, to effect expression of said liquid from said left streamer nozzle at a velocity having a vector parallel with said roadway surface substantially corresponding with said vehicle velocity and at said target volume per unit length of pavement of said liquid.

19. The apparatus of claim 18 in which:

said nozzle assembly support locates said left streamer nozzle in spaced adjacency with said roadway surface to generally encounter an airflow surface effect.

20. The apparatus of claim 18 in which said first pump is a fixed displacement pump.

21. The apparatus of claim 18 in which:

said nozzle assembly nozzle support locates said left streamer nozzle leftwardly outwardly from said left wheel track.

22. The apparatus of claim 18 in which:

said nozzle assembly further comprises a right streamer nozzle, said right streamer nozzle being supported by said nozzle support laterally from said right wheel track in spaced adjacency with said pavement surface in a rearwardly directed orientation wherein the nozzle axis thereof extends substantially parallel with said roadway surface and said vehicle forward direction;

further comprising a second pump supportable upon said vehicle, coupled in driven relationship with said drive output, having a second pump input coupled in fluid flow transfer relationship with said tank assembly and a second pump output coupled in fluid flow transfer relationship with the input of said right streamer nozzle; and

said control assembly is responsive to said vehicle velocity to control said motor assembly, when activated, in correspondence with a right nozzle target volume of said liquid per unit length of pavement, the output of said second pump and the effective diameter of said right streamer nozzle at a velocity having a vector parallel with said roadway surface substantially corresponding with said vehicle velocity and at said right nozzle target volume of said liquid.

23. The apparatus of claim 22 in which said second pump is a fixed displacement pump.

24. The apparatus of claim 22 in which:

said nozzle assembly further comprises an intermediate streamer nozzle, said intermediate streamer nozzle being supported by said nozzle support between said right wheel track and said left wheel track in spaced adjacency with said pavement surface in an orientation wherein the nozzle axis thereof extends substantially parallel with said roadway surface and said vehicle forward direction;

further comprising a third pump supportable upon said vehicle, coupled in driven relationship with said drive output, having a third pump input coupled in fluid flow transfer relationship with said tank assembly and a third pump output coupled in fluid flow transfer relationship with the input of said intermediate streamer nozzle; and

said control assembly is responsive to said vehicle velocity to control said motor assembly, when activated, in correspondence with an intermediate nozzle target volume of said liquid per unit length of pavement, the output of said third pump and the effective diameter of said intermediate streamer nozzle at a velocity having a vector parallel with said roadway surface substantially corresponding with said vehicle velocity and at said intermediate nozzle target volume of said liquid.

25. The apparatus of claim 24 in which said third pump is a fixed displacement pump.

26. The apparatus of claim 22 in which:

said nozzle assembly nozzle support locates said right streamer nozzle in spaced adjacency with said roadway surface to generally encounter an airflow surface effect;

27. The apparatus of claim 22 in which:

said nozzle assembly nozzle support locates said right streamer nozzle rightwardly outwardly from said right wheel track.

28. The apparatus of claim 22 in which said motor assembly comprises:

a first motor having a drive output coupled in driving relationship with said first pump; and

a second motor having a drive output coupled in driving relationship with said second pump.

29. The apparatus of claim 24 in which said motor assembly comprises:

a first motor having a drive output coupled in driving relationship with said first pump;

a second motor having a drive output coupled in driving relationship with said second pump; and

a third motor having a drive output coupled in driving relationship with said third pump.

30. The apparatus of claim 18 further comprising:

a frame assembly configured to support said tank assembly, said nozzle assembly, said motor assembly and said first pump, and further configured for removable positioning upon said vehicle support portion.

31. The apparatus of claim 30 in which:

said vehicle is a truck wherein said support portion is a truck bed located a bed height above said pavement;

said frame assembly is configured having right and left rigid standards adjacent said nozzle support for locating said frame a mounting elevation above ground level corresponding with said bed height, and further having right and left forward legs of length generally corresponding with said pivotally coupled with a forward portion of said frame assembly, having a vertical orientation for supporting said frame assembly at about said bed height and rearwardly pivoted to an extent effective to maneuver said frame assembly onto said truck bed.

32. The apparatus of claim 30 in which:

said vehicle is a trailer wherein said support portion is a trailer bed; and

said frame assembly is configured for mounting upon said trailer bed.

33. The apparatus of claim 18 in which:

said vehicle is a truck wherein said leftward and rightward pavement engaging wheels include forward leftward and rightward pavement engaging wheels and rearward leftward and rightward pavement engaging wheels; and

said nozzle assembly is supported from said truck generally forwardly of said forward leftward and rightward pavement engaging wheels.

34. The apparatus of claim 33 in which:

said truck is configured with a forward depending snow/ice control plow; and

said nozzle assembly is supported rearwardly of said plow.

35. The apparatus of claim 24 further comprising:

a snow/ice treatment liquid distribution manifold, supported from said nozzle support generally above said right, left and intermediate streamer nozzles, having one or more liquid inputs, and an array of a predetermined number of liquid output ports;

an array of said predetermined number of rearwardly directed alternate streamer nozzles supported in generally regularly spaced fashion by said nozzle support and generally extending between said left and right streamer nozzles, each said alternate streamer nozzle having an input, a nozzle axis and a nozzle effective diameter and being located in spaced adjacency with said pavement surface in an orientation wherein the nozzle axis thereof extends substantially parallel with said roadway surface and vehicle forward direction;

an array of said predetermined number of nozzle conduits extending in fluid flow communication between said manifold array of liquid output ports and the inputs of said array of alternate streamer nozzles;

one or more metering conduits extending in fluid flow communication between the output of one or more said first, second or third pumps and said one or more liquid distribution manifold liquid inputs;

the number of outputs of said one or more first, second and third pumps and the effective diameter of said alternate streamer nozzles being selected in correspondence with a target volume of said liquid per unit length of pavement.

36. The apparatus of claim 35 further comprising:

an election valve assembly selectively actuable to effect fluid flow between said first, second and third pumps and respective left, right and intermediate

streamer nozzles or between one or more of said first, second and third pumps and said delivery manifold.

37. The apparatus of claim 35 in which:

said array of alternate streamer nozzles are supported in spaced adjacency with said roadway surface to generally encounter an airflow surface effect.

38. Snow/ice control apparatus for treating the surface of a roadway by depositing snow/ice treatment liquid thereon from a vehicle moving at a given forward velocity and direction, having leftward and rightward pavement engaging wheels generally exhibiting respective left and right wheel tracks spaced apart a vehicle track width, and having a support portion, comprising:

a tank assembly mountable upon said vehicle support portion and configured to retain a quantity of said snow/ice treatment liquid;

a nozzle assembly mountable upon said vehicle including a nozzle support extending in spaced adjacency with said roadway and extending rearwardly of said wheels along said vehicle track width and a plurality of spaced apart rearwardly directed streamer nozzles of given number each having an input, a nozzle axis and a nozzle effective diameter each said streamer nozzle being supported by said nozzle support in spaced adjacency with said pavement surface in an orientation wherein the nozzle axis thereof extends substantially parallel with said roadway surface and vehicle forward direction;

a motor assembly supportable upon said vehicle and controllable to provide one or more drive outputs;

a pump assembly having a first pump supportable upon said vehicle, coupled in driven relationship with a said drive output, having a first pump input coupled in fluid flow transfer relationship with said tank assembly and a first pump output;

a liquid distribution manifold supportable upon said vehicle, having a first liquid input coupled in fluid flow transfer communication with said first pump output and a plurality of output ports of said given number;

a distribution conduit assembly configured to couple each said given number of output ports with a corresponding respective said streamer nozzle input; and

a control assembly responsive to said vehicle velocity to control said motor assembly in correspondence with a target volume of said liquid per unit length of pavement, the output of said first pump and the sum of the effective diameters of said given number of streamer nozzles to effect expression of said liquid from said plurality of streamer nozzles at a velocity having a vector parallel with said roadway surface substantially corresponding with said vehicle velocity and with a combined volume per unit length of pavement corresponding with said target volume.

39. The apparatus of claim 38 in which:
said first pump is a fixed displacement pump.

40. The apparatus of claim 38 in which:
said nozzle assembly nozzle support locates said plurality of streamer nozzles in spaced adjacency with said roadway surface to generally encounter an airflow surface effect.

41. The apparatus of claim 38 in which:
said plurality of streamer nozzles are supported by said nozzle support in regularly spaced apart relationship.

42. The apparatus of claim 38 in which:
said liquid distribution manifold is supported by said nozzle support at a location generally above said plurality of streamer nozzles.

43. The apparatus of claim 38 in which:
said plurality of streamer nozzles are supported by said nozzle support in an orientation wherein said nozzle axes thereof are canted downwardly toward said roadway surface at an angle from about 0° to about 5°.

44. The apparatus of claim 38 in which:

said pump assembly includes a second pump supportable upon said vehicle, coupled in driven relationship with a said drive output, having a second pump input coupled in fluid flow transfer relationship with said tank assembly and a second pump output;

said liquid distribution manifold has a second liquid input coupled in fluid flow transfer relationship with said second pump output; and

said control assembly is responsive to said vehicle velocity to control said motor assembly in correspondence with said target volume of said liquid per unit length of pavement, the sum of the outputs of said first and second pumps and the sum of the effective diameters of said given number of streamer nozzles to effect expression of said liquid from said plurality of streamer nozzles at a velocity having a vector parallel with said roadway surface substantially corresponding with said vehicle velocity and with a combined volume per unit length of pavement corresponding with said target volume.